AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for verifying whether a trace can be produced by a generator, comprising:

receiving a specification for the generator, wherein the generator is a finite state machine that defines a set of inputs and outputs, and wherein the generator contains ~~may contain~~ parametric inputs to model non-determinism;

receiving the trace, wherein the trace is a sequence of assignments of non-parametric inputs and outputs for the generator, and wherein the trace does not contain assignments of parametric inputs;

using the specification to build a data structure that can be used to determine if a non-parametric input and output are consistent with the current state of the generator; ~~and~~

verifying elements of the trace, wherein verifying a given element involves using the data structure to determine if there exists any parametric input assignment that causes a match between non-parametric inputs and outputs of the generator with the ones specified in the given element of the trace; and

if the specification of the generator is sequentially deterministic, and hence does not depend on parametric inputs, translating the generator into a checker and using that checker to verify the trace.

2. (Original) The method of claim 1,

wherein the generator is sequentially deterministic, which means that there exists a single next state for each combination of current state, non-parametric input, and output; and

wherein using the data structure to determine if there exists any parametric input assignment involves,

using the data structure to perform a satisfiability test to determine if there exist any parametric inputs that can match the non-parametric input and output assignment of the generator with the ones of the trace at a current state, and

computing a unique next state based on the current state, the non-parametric input and the output.

3. (Original) The method of claim 1,

wherein the generator is sequentially non-deterministic, which means that the next state can depend on a parametric input, and consequently there can exist more than one next state for some combinations of current state, non-parametric input, and output; and

wherein using the data structure to determine if there exists any parametric input assignment involves determining a set of next states;

wherein determining the set of next states involves considering all possible parametric inputs, all states in a current set of states, the non-parametric input and the output;

wherein if there exists at least one state in the set of next states, the non-parametric input and output are consistent with the generator.

4. (Original) The method of claim 3, wherein determining the set of next states involves computing a forward image and constraining the parametric input and output to their assignments in the trace.

5. (Original) The method of claim 1, wherein the trace is produced by a simulation of a system under test.

6. (Original) The method of claim 1, wherein the data structure is in the form of a binary decision diagram (BDD).

7. (Original) The method of claim 1, wherein if for all possible parametric inputs the non-parametric input and output are not consistent with a generator output, the trace is not valid.

8 (Canceled).

9. (Currently amended) A computer-readable storage medium storing instructions that when executed by a computer cause the computer to perform method for verifying whether a trace can be produced by a generator, comprising:

receiving a specification for the generator, wherein the generator is a finite state machine that defines a set of inputs and outputs, and wherein the generator contains ~~may contain~~ parametric inputs to model non-determinism;

receiving the trace, wherein the trace is a sequence of assignments of non-parametric inputs and outputs for the generator, and wherein the trace does not contain assignments of parametric inputs;

using the specification to build a data structure that can be used to determine if a non-parametric input and output are consistent with a parametric input and output for the generator; ~~and~~

verifying elements of the trace, wherein verifying a given element involves using the data structure to determine if there exists any parametric input assignment that causes a match between non-parametric inputs and outputs of the generator with the ones specified in the given element of the trace; and

if the specification of the generator is sequentially deterministic, and hence does not depend on parametric inputs, translating the generator into a checker and using that checker to verify the trace.

10. (Original) The computer-readable storage medium of claim 9,

wherein the generator is sequentially deterministic, which means that there exists a single next state for each combination of current state, non-parametric input, and output; and

wherein using the data structure to determine if there exists any parametric input assignment involves,

using the data structure to perform a satisfiability test to determine if there exist any parametric inputs that can match the non-parametric input and output assignment of the generator with the ones of the trace at a current state, and

computing a unique next state based on the current state, the non-parametric input and the output.

11. (Original) The computer-readable storage medium of claim 9,

wherein the generator is sequentially non-deterministic, which means that the next state can depend on a parametric input, and consequently there can exist more than one next state for some combinations of current state, non-parametric input, and output; and

wherein using the data structure to determine if there exists any parametric input assignment involves determining a set of next states of a generator;

wherein determining the set of next states involves considering all possible parametric inputs, all states in a current set of states, the non-parametric input and the output;

wherein if there exists at least one state in the set of next states, the non-parametric input and output are consistent with the generator.

12. (Original) The computer-readable storage medium of claim 11, wherein determining the set of next states involves computing a forward image and constraining the parametric input and output to their assignments in the trace.

13. (Original) The computer-readable storage medium of claim 9, wherein the trace is produced by a simulation of a system under test.

14. (Original) The computer-readable storage medium of claim 9, wherein the data structure is in the form of a binary decision diagram (BDD).

15. (Original) The computer-readable storage medium of claim 9, wherein if for all possible parametric inputs the non-parametric input and output are not consistent with a generator output, the trace is not valid.

16 (Canceled).

17. (Currently amended) An apparatus that verifies whether a trace can be produced by a generator, comprising:

a receiving mechanism configured to receive a specification for the generator, wherein the generator is a finite state machine that defines a set of inputs and outputs, and wherein the generator contains ~~may contain~~ parametric inputs to model non-determinism;

wherein the receiving mechanism is additionally configured to receive the trace, wherein the trace is a sequence of assignments of non-parametric inputs and

outputs for the generator, and wherein the trace does not contain assignments of parametric inputs;

a data structure building mechanism configured to use the specification to build a data structure that can be used to determine if a non-parametric input and output are consistent with a parametric input and output for the generator; ~~and~~

a verification mechanism configured to verify elements of the trace, wherein verifying a given element involves using the data structure to determine if there exists any parametric input assignment that causes a match between non-parametric inputs and outputs of the generator with the ones specified in the given element of the trace; and

a translation mechanism configured to translate the generator into a checker and use that checker to verify the trace if the specification of the generator is sequentially deterministic, and hence does not depend on parametric inputs.

18. (Original) The apparatus of claim 17,

wherein the generator is sequentially deterministic, which means that there exists a single next state for each combination of current state, non-parametric input, and output; and

wherein while using the data structure to determine if there exists any parametric input assignment, the verification mechanism is configured to,

use the data structure to perform a satisfiability test to determine if there exist any parametric inputs that can match the non-parametric input and output assignment of the generator with the ones of the trace at a current state, and to

compute a unique next state based on the current state, the non-parametric input and the output.

19. (Original) The apparatus of claim 17,

wherein the generator is sequentially non-deterministic, which means that the next state can depend on a parametric input, and consequently there can exist more than one next state for some combinations of current state, non-parametric input, and output; and

wherein while using the data structure to determine if there exists any parametric input assignment, the verification mechanism is configured to determine a set of next states of a generator;

wherein determining the set of next states involves considering all possible parametric inputs, all states in a current set of states, the non-parametric input and the output;

wherein if there exists at least one state in the set of next states, the non-parametric input and output are consistent with the generator.

20. (Original) The apparatus of claim 19, wherein while determining the set of next states the verification mechanism is configured to compute a forward image and constraining the parametric input and output to their assignments in the trace.

21. (Original) The apparatus of claim 17, wherein the trace is produced by a simulation of a system under test.

22. (Original) The apparatus of claim 17, wherein the data structure is in the form of a binary decision diagram (BDD).

23. (Original) The apparatus of claim 17, wherein if for all possible parametric inputs the non-parametric input and output are not consistent with a generator output, the trace is not valid.

24 (Canceled).

25. (Currently amended) A means for verifying whether a trace can be produced by a generator, comprising:

a receiving means for receiving a specification for the generator, wherein the generator is a finite state machine that defines a set of inputs and outputs, and wherein the generator contains ~~may contain~~ parametric inputs to model non-determinism;

wherein the receiving means is additionally configured to receive the trace, wherein the trace is a sequence of assignments of non-parametric inputs and outputs for the generator, and wherein the trace does not contain assignments of parametric inputs;

a data structure building means configured to use the specification to build a data structure that can be used to determine if a non-parametric input and output are consistent with a parametric input and output for the generator; ~~and~~

a verification means configured to verify elements of the trace, wherein verifying a given element involves using the data structure to determine if there exists any parametric input assignment that causes a match between non-parametric inputs and outputs of the generator with the ones specified in the given element of the trace; and

a translation means configured to translate the generator into a checker and use that checker to verify the trace if the specification of the generator is sequentially deterministic, and hence does not depend on parametric inputs.